REMARKS/ARGUMENTS

Favorable reconsideration of this application is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 4-8, 11, 13-15, and 18-32 are pending. Claim 8 and 22-24 are amended. Claims 1-3, 8, 10, 12, 16, and 17 are canceled. Claims 4-7, 11, and 22-27 are withdrawn. Support for the amendment to Claim 8 can be found in Figs. 6 and 8A, and the description thereof, for example. Claims 22-24 are amended to update dependencies in view of the cancelation of Claim 16. No new matter is added.

In the outstanding Office Action, Claims 8, 15, 18-20, 28, and 29 were rejected under 35 U.S.C. § 103(a) as obvious over Koshiishi et al. (U.S. Patent Pub. 2003/0106647, herein "Koshiishi") in view of Masuda et al. (U.S. Patent Pub. 2002/0005252, herein "Masuda") and Nishikawa (WO 02/065532). Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as obvious over Koshiishi, Masuda, Nishikawa, and Kanno et al. (U.S. Patent No. 6,373,681, herein "Kanno"). Claim 21 was rejected under 35 U.S.C. § 103(a) as obvious over Koshiishi, Masuda, Nishikawa, and Huang (U.S. Patent No. 2004/0005726). Claim 30 was rejected under 35 U.S.C. § 103(a) as obvious over Koshiishi, Masuda, Nishikawa, and Hasegawa et al. (U.S. Patent No. 5,556,500, herein "Hasegawa"). Claims 31 and 32 were rejected under 35 U.S.C. § 103(a) as obvious over Koshiishi, Masuda, Nishikawa, and Birang et al. (U.S. Patent No. 5,491,603, herein "Birang").

Regarding the rejection of Claim 8 as obvious over Koshiishi, Masuda, and Nishikawa and the rejections of the various dependent claims over the remaining cited references, those rejections are respectfully traversed by the present response.

Amended independent Claim 8 recites, in part:

> said heat exchange means further comprises a supply path that supplies the heat transfer medium to said groove;
> said controller is configured to control a pressure of the heat transfer medium supplied from said heat exchange means

> and configured to change the pressure of the heat transfer medium supplied in accordance with each of multiple steps of the plasma process; and
>
> the controller is configured to set the pressure of the heat transfer medium filled into said groove which is covered by said focus ring in contact with said electrostatic chuck to a non-zero level during conveying of the object to be processed into and out of said chamber so as to carry out cooling of said focus ring during conveying the object into and out of said chamber.

Thus, Claim 8 recites that the controller sets the pressure of the heat transfer medium filled into the groove, which is covered by the focus ring, to a non-zero level during conveying of the object to be processed into and out of the chamber so as to carry out cooling of the focus ring during conveying the object into and out of the chamber.

One benefit of the above-noted relationship is that it is possible to prepare for the dry etching of a next wafer W, i.e. to better remove heat from the focus ring (30), and thus make dry etching conditions more uniform for all of the wafers W.

In contrast, Koshiishi describes changing a DC voltage applied to a wafer-attracting electrode (22) (paragraph [0057]).

Musada describes that a flow path (136B) of heat transfer gas is formed between a sample folder ring (132) and an electrostatic chucking device (131) and that a part of heat transfer gas for cooling wafer is introduced into the flow path (136B) (paragraph [0067]).

Huang describes a heat transfer means (54) adjusting the temperature of a focus ring (52) (Fig. 3).

Hasegawa describes placing and attaching an annular thin plate part (116) formed of tungsten, etc., which corresponds to an outer part (106) of a focus ring (102) on an outer circular surface of a base part (114) which corresponds to an inner part (104) of the focus ring (102) (col. 9, lines 51 to 60 and FIG. 6). Hasegawa further describes placing and attaching an annular thin plate part (124) formed of amorphous carbon, etc., which corresponds to the

inner part (104) on an inner circular surface of a base part (126) of the focus ring (102) (col. 9, line 65 to col. 10, line 6 and FIG. 6).

Birang describes that shortly before a wafer (101) drops onto a chuck (110), a chucking voltage supply (120) applies a high DC voltage, on the order of +2000 volts to a chuck electrode (133) relative to ground (col. 3, lines 19 to 23).

However, none of the references discloses or suggests controlling the pressure of heat transfer gas in a groove covered by a focus ring during conveying of a wafer (an object to be processed) into and out of a chamber. The outstanding Office Action, on page 6, acknowledges that Koshiishi and Masuda fail to disclose the above-noted feature and relies on Nishikawa to remedy that deficiency.

Nishikawa describes that a heated He gas or heated N_2 gas is supplied from gas supply holes (14) of a mounting stage (5) to the interior of a process chamber (2), which is a processing space not covered by any component, so that inactive gas layers are formed of the heated He gas or heated N_2 gas above the mounting stage so as to preclude heavy metal particles from adhering to a mounting surface of the mounting stage (5) from when a processed workpiece W leaves from the mounting surface until immediately before a new workpiece W next to be processed is held on the mounting surface (page 11, line 14 to page 23, line 22 (paragraphs [0044] to [0094]).

However, as described above, in Nishikawa, the He gas or the N_2 gas is not supplied to a groove which is covered by a focus ring but is instead supplied to the **interior of the process chamber (2)**, which is not covered by any component, much less covered by a focus ring. Moreover, in Nishikawa, the He gas or the N_2 gas never transfers heat energy between two objects but covers the mounting surface of the mounting stage 5 so as to preclude heavy metal particles from adhering thereto.

The destination of the heat transfer medium recited in Claim 8 is different from the destination of the heated He gas or the heated N_2 gas in Nishikawa. Moreover, the functions of the heat transfer medium in the apparatus recited in Claim 8 are different from that of the heated He gas or the heated N_2 gas in Nishikawa. Therefore, Nishikawa does not provide the beneficial full removal of heat from a focus ring so as to prepare for dry etching of a next workpiece W during carrying the workpiece W into and out of the process chamber (2) and thus make the dry etching conditions uniform for all of the workpieces W.

Moreover, the Supreme Court established in KSR Int'l Co. v. Teleflex Inc. that a **supported rational** reason must be provided as a basis for a conclusion or a determination of obviousness. In Ex parte Whalen, 89 USPQ2d 1078 (BPAI, July 23, 2008), the Board of Patent Appeals and Interferences applied the legal standard set forth in KSR:

> The *KSR* Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have had some "apparent reason to combine the known elements in the fashion claimed." *Ex parte Whalen*, 89 USPQ2d at 1084, (quoting *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (2007) (citations omitted).

Thus, merely showing that the claimed elements existed before the claimed invention was made is insufficient to prove obviousness. Nor is it sufficient to establish that a person of ordinary skill in the art would have been capable of modifying the cited references to produce the claimed invention. Rather, it must be shown, without using impermissible hindsight, that a person of ordinary skill in the art would have had an apparent reason to modify the references to produce the claimed invention.

In the present case, the outstanding Office Action asserts:

> Though Nihikawa does not explicitly teach the heat transfer gas supply and pressure is controlled at the contact surface, it would be obvious to control the supply of heat transfer gas to the contact surface dring process steps, and keep the pressure of the ehat transfer gas to non-zero during conveying

> in/out of the wafer in the apparatus of Koshiishi et al in view of Masuda et al, in view of teaching of Nishikawa et al to control temperature of the focus ring and avoid workpiece contamination.[1]

Thus, the outstanding Office Action asserts a reason for modifying Nihikawa to control pressure at the contact surface. However, it is the acknowledged deficiency in the combination of Koshiishi and Masuda that must be remedied.

In this regard, Nihikawa **supplies inactive gas layers formed of the heated He gas or heated N_2 gas above the mounting stage so as to preclude heavy metal particles from adhering to a mounting surface of the mounting stage during transport of the substrate to and from the stage**. In light of this purpose of Nihikawa, a person of ordinary skill in the art reading Nihikawa would have had no apparent reason to provide controlled pressure in a groove covered by a focus ring during conveying an object to be processed into and out of a chamber. Rather, Nihikawa intends to form a protective blanket, and controlling pressure inside a covered groove does not correspond to forming a blanket. Thus, a person of ordinary skill in the art would have had no apparent reason to modify Koshiishi and Masuda to provide a controller configured to set the pressure of the heat transfer medium filled into said groove which is covered by said focus ring in contact with said electrostatic chuck to a non-zero level during conveying of the object to be processed into and out of said chamber so as to carry out cooling of said focus ring during conveying the object into and out of said chamber.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. A Notice of Allowance for Claims 4-8, 11, 13-15, and 18-32 is earnestly solicited.

[1] Outstanding Office Action, page 7.

Should Examiner Dhingra deem that any further action is necessary to place this application in even better form for allowance, he is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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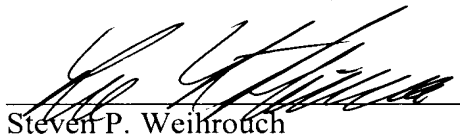

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